

## **REMARKS**

Claims 1-22 are currently pending. Claims 1 and 13-16 have been amended. Claims 17-22 have been added. Applicant acknowledges and appreciates the Examiner's indication that claims 4-5 and 11-12 are allowable. Accordingly, Applicant has rewritten objected to claim 5 as allowable independent claim 21 and objected to claim 11 as allowable independent claim 22.

The Examiner objected to the title for not being descriptive. Applicant has amended the title to "Geroter Type Internal Combustion Engine". The title suggested by the Examiner was not used because Applicant believes it to be too narrow. Specifically, the suggested title could be interpreted to imply that the claimed invention required both a compression and an expansion geroter when the claims (e.g., claim 1) could be read on a device that includes a single geroter.

The Examiner objected to the Applicants' use of "outlet aperture" and "kidney-shaped outlet aperture," and "inlet aperture" and "kidney-shaped inlet aperture." Applicant has amended the first full paragraph of page 5 and the paragraph beginning on page 7 and ending on page 8 to remove any references to "kidney-shaped inlet aperture" and "kidney-shaped outlet aperture."

The Examiner rejected Claims 1, 6-8, and 13 under 35 U.S.C. §102(b) as being anticipated by Creek (U.S. Patent No. 3,548,789).

Amended claim 1 defines an internal combustion engine that includes a housing, an intake port defined in the housing, and an exhaust port defined in the housing. A generally cylindrical combustion chamber is defined in the housing and communicates with the intake port and the exhaust port. A combustion geroter is received by the combustion chamber and

is rotatable therein to receive a fuel mixture, compress the fuel mixture, combust the fuel mixture, and discharge the combusted fuel mixture to the exhaust port. The geroter includes an outer gear and an inner gear. The inner gear includes a shaft aperture and is otherwise substantially solid.

Creek does not teach or suggest a geroter that includes an inner gear that is supported on a shaft but that is otherwise substantially solid. Rather, Creek discloses an engine that includes a first ring gear 10 and a first pinion gear 53, shown in Fig. 7, and a second ring gear 12 and a second pinion gear 55, shown in Fig. 8. Both pinion gears 53, 55 are substantially hollow. The first pinion gear 53 includes passages 72 that allow for the passage of compressed fluid. The second pinion gear 55 is substantially hollow to allow for the capture and redirection of blow-by gasses. *See col. 5, lines 2-10.* Thus, the inner pinions 53, 55, as taught by Creek, must include passages or must be hollow.

In light of the foregoing, Creek does not teach or suggest each and every limitation of claim 1. As such, claim 1 is allowable. In addition, claims 6-8, which depend from claim 1, are allowable for these and other reasons.

Amended claim 13 defines a method for rotatably driving a drive shaft. The method includes providing a first geroter having an inner gear coupled to the drive shaft and an outer gear engaging the inner gear. The method also includes providing a second geroter having a second inner gear coupled to the drive shaft and a second outer gear engaging the second inner gear. The method further includes delivering a fuel mixture to the first geroter, compressing the fuel mixture in the first geroter, and directing the fuel mixture from the first geroter to a second geroter via an intermediate manifold. The intermediate manifold is completely defined by a stationary housing between the first geroter and the second geroter. The method

also includes combusting the compressed fuel mixture in the second geroter, expanding the combusted fuel mixture in the second geroter to drivingly rotate the second geroter and the drive shaft, and discharging the expanded fuel mixture from the second geroter.

Creek does not teach or suggest a method of driving a drive shaft that includes, among other things, directing the fuel mixture from the first geroter to a second geroter via an intermediate manifold that is completely defined by a stationary housing between the first geroter and the second geroter. Rather, Creek discloses an engine that includes a first ring gear 10 and a first pinion gear 53 that cooperate to precompress the working fluid and a second ring gear 12 and a second pinion gear 55 that cooperate to combust and expand the fluid. A path (defined by the passageway 72, the space 73, the port 74, passages 80 and 81, the combustion chamber 28, and the cavity 82) between the two ring gears 10, 12 is partially defined by the shaft (i.e., the space 73 is within the shaft 47) that supports the first pinion gear 53 and partially defined by the housing. Thus, the path is not completely defined by the stationary housing.

In light of the foregoing, Creek does not teach or suggest each and every limitation of claim 13. As such, claim 13 is allowable. In addition, claim 17, which depends from claim 13, is allowable for these and other reasons.

The Examiner rejected claims 2-3, 9-10, and 14-15 under 35 U.S.C. §103(a) as being unpatentable over Creek in view of Voest (French Patent No. 2,574,868).

Claims 2-3 and 9-10 depend from claim 1. As discussed above, Creek does not teach or suggest each and every limitation of claim 1.

Voest does not cure the deficiencies of Creek. Voest discloses a gear pump that includes an inner gear (3, 9) that rotates about a first axis (shaft 19), and an outer gear (1, 7)

that rotates about a second axis that is offset from the first axis. If one of ordinary skill in the art did combine the teachings of Voest with those of Creek, one would not arrive at the invention recited in claim 1. Specifically, the use of the solid inner gears, as described in Voest, would not allow the engine of Creek to be used for its intended purpose. In addition, the solid inner gears of Voest could not be used in the device of Creek without substantial modification and experimentation, which is not taught or suggested. In addition, Creek teaches away from using solid gears by discussing the advantages of using hollow inner gears. Thus, one of ordinary skill would likely choose to use hollow inner gears as taught by Creek, rather than solid inner gears.

In light of the foregoing, Creek and Voest, alone or in combination, do not teach or suggest each and every limitation of claim 1. As such, claim 1 is allowable. In addition, claims 2-3 and 9-10, which depend from claim 1 are allowable for these and other reasons.

Claims 14-15 depend from claim 13. As discussed above, Creek does not teach or suggest each and every limitation of claim 13.

Voest does not cure the deficiencies of Creek. Voest does not teach or suggest a method of driving a drive shaft that includes, among other things, directing the fuel mixture from the first geroter to a second geroter via an intermediate manifold that is completely defined by a stationary housing. Rather, Voest discloses a gear pump that includes an inner gear (3, 9) that rotates about a first axis (shaft 19), and an outer gear (1, 7) that rotates about a second axis that is offset from the first axis. The portion 17 defines a flow path 28. However, the portion 17 is not defined between the rotating outer gears (1, 7). Rather, the portion 17 extends into the space occupied by the gears (1, 7) that partially define the pump or geroter portions.

In light of the foregoing, Creek and Voest, alone or in combination, do not teach or suggest each and every limitation of claim 13. As such, claim 13 is allowable. In addition, claims 14-15, which depend from claim 13 are allowable for these and other reasons.

The Examiner rejected claim 16 under 35 U.S.C. §103(a) as being unpatentable over Creek in view of Freeman (U.S. Patent No. 5,195,882).

Claim 16 depends from claim 13. As discussed above, Creek does not teach or suggest each and every limitation of claim 13.

Freeman does not cure the deficiencies of Creek. Freeman discloses a single gerotor pump that includes an inner gear 16 and an outer gear 12. There is no discussion of a housing or an intermediate manifold between geroters, much less an intermediate manifold completely defined by the housing and disposed between a first geroter and a second geroter.

In light of the foregoing, Creek and Freeman, alone or in combination, do not teach or suggest each and every limitation of claim 13, much less those of claim 16. As such, claim 13 is allowable. In addition, claim 16, which depends from claim 13, is allowable for these and other reasons.


New claims 18-20 recite subject matter not taught or suggested by the prior art. As such, new claims 18-20 are also allowable.

### **CONCLUSION**

In light of the foregoing, Applicant respectfully submits that Claims 1-20 are allowable.

The undersigned is available for telephone consultation during normal business hours.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'TJ Otterlee', with a stylized flourish at the end.

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